RedHawk Energy

EV Charging

Power Infrastructure Solutions

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EV Charging Power Infrastructure Solutions

Power Grid Challenge

The move to electric vehicles (EVs) aims to save the world from air pollution, oil spills and climate issues. Achieving this demands an energy infrastructure that generates enough power to keep EVs charged to drive anywhere, anytime. Unfortunately today's electricity grids simply can't support the growing demand for fast charging everywhere it is needed. When electric vehicles consume power from the grid they are just transferring CO2 emissions from car exhaust pipes to power station smokestacks which doesn't solve the problem of eliminating emissions.

Increasing Demand for Electricity

With electric vehicles' consumption of large amounts of electricity, and the increasing number of EVs, the demand for electricity is expected to increase exponentially. Expanding the grid for fast charging everywhere is costly, time-consuming and not always justified or possible.

Green Power Solutions

Charging EVs Without Defeating the Purpose

Combining green power generation technologies (**solar (pv), energy storage (batteries), fuel cells and other alternative power generators**) can provide clean and reliable EV charging to maximize economics, boost energy efficiency and protect the environment.

Off-Grid EV Power Solution

Onsite green power generation to provide 100% charging power for EVs.

 *Solar Array* +  *Energy Storage* +  *Fuel Cells*

Grid-Connected EV Power Solution

Onsite green power generation that works alongside and/or provides backup to the electric grid during outages or peak demand.

 *AC Utility* +  *Solar Array* +  *Energy Storage* +  *Fuel Cells*

EV Charging Overview

***Level 1* Charging**

Level 1 EV charging utilizes the slowest EV charger available, which provides between 1kW and 1.8kW of power through a standard 120V AC outlet. Level 1 EV charging is typically what is used at a residential location and will take 22-40 hours to fully charge.

***Level 2* Charging**

Level 2 EV charging is much faster then Level 1 and utilizes a 208V to 240V AC outlet. Level 2 chargers provide up to around 20kW of power. Level 2 charging can recharge an EV in 2-13 hours depending on power available.

***Level 3* Charging**

Level 3 charging (also known as **DC Fast Charging**) is significantly faster then Level 2 and typically utilizes a three-phase 480V AC outlet. Level 3 EV chargers can provide up to 360kW of charging power to recharge an EV in 15 minutes to 1.5 hours.

EV Charging Applications:

- ***Auto Dealers / EV OEMs***
- ***Shopping Malls & Retail Sites***
- ***Fleet Management / Car Rental***
- ***Corporate Office Buildings***
- ***Convenience Stores & Filling Stations***
- ***Hotels***

Solar (PV) Power

Solar (PV) Power Systems provide a reliable, proven source of DC power by converting sunlight directly to electricity. Utilizing Solar (PV) for EV Charging makes a lot of sense as it's a natural resource that requires minimal maintenance, has no ongoing fueling requirements and has very little negative impact on the environment. When paired with energy storage (batteries), electricity generated can be stored for later use.

At **RedHawk Energy,** we have over 40+ years of experience with the design, engineering and supply of Solar (PV) Power Systems for both off-grid (remote site) and grid-tie applications. Systems are configured for the specific geographical location and load demands of your application. Solar calculations and sizing is performed using the latest solar radiation data, surface meteorology data and software sizing programs.

Solar (PV) Mounting Options

We offer flexible mounting options to meet virtually an budget and/or site requirement.

Ground

Roof

Platform / Carport

Ancillary Equipment

We can provide a range of components to complete the system including (but not limited to) the following:

Energy Storage

Energy Storage (batteries) is a vital component of both off-grid and grid-connected EV charging solutions. With its high energy density, lithium ion is currently the dominant battery technology for Energy Storage Systems. Lithium ion comes in a wide variety of chemistry combinations, with **Nickel Manganese Cobalt (NMC)** and **Lithium Iron Phosphate (LFP)** having the highest levels of maturity.

At **RedHawk Energy**, we have relationships and partnerships with several advanced battery technology manufacturers and can provide Energy Storage options to meet a wide range of requirements.

Benefits of Energy Storage

Reduce EV Charging Costs

Shifts charging to times when electricity is cheaper, which can help reduce the cost the energy ysed for charging EVs.

Reduce Demand Charges

Helps reduce demand charges by storing electricity during low demand and releasing it when EV charging stations are in use.

Improve Reliability & Resilience

Ability to provide backup power to EV charging stations in the event of a utility power outage or other disruption. This ensures that EVs can be charged even when the grid is unavailable.

Increase EV Charging Capacity

Opportunity to increase the charging capacity of an EV charging station by storing excess electricity when demand is low and releasing it when demand is high. This also helps to avoid overloading the utility grid and reduce costly grid upgrades.

Improve Efficiency

Improve overall efficiency of EV charging stations by reducing the amount of electricty lost during transmission and optimizing charging.

Alkaline Fuel Cells

Alkaline Fuel Cells (AFC) have the potential to play an important role in EV Charging infrastructure as a means of providing power during peak demand and during times of outages. Alkaline Fuel Cells can generate clean, reliable, continuous, uninterrupted flow of power, in any weather condition. Compared to noisy, maintenance-intensive gas or diesel generators, Alkaline Fuel Cells powered by hydrogen or ammonia can generate zero-emission power quietly with minimal maintenance requirements.

At **RedHawk Energy**, we have a strategic partnership with GenCell Energy. GenCell's EVOX™ technology integrates their Alkaline Fuel Cells with a battery-driven energy bridge for power storage and with energy monitoring and management software for grid-independent EV charging stations.

GENCELL

Benefits of Alkaline Fuel Cells

Zero-Emissions Power

Matches the same zero-emission philosophy of Electric Vehicles (EV). Alkaline Fuel Cells carry out an electrochemical process combining hydrogen and oxygen to generate zero-emission power, with water and heat as the only byproducts.

Extreme Weather Performance

Alkaline Fuel Cells can be deployed in a wide range of environments to provide reliable power to EV charging stations. Utilizing a liquid electrolyte (KOH), AFCs can operate at temperatures down to -40°C (-40°F) enabling them to operate in both warm and sub-freezing conditions.

Improve Reliability & Resilience

Ability to provide backup power to EV charging stations in the event of a utility power outage or other disruption. This ensures that EVs can be charged even when the grid is unavailable.

Complete System

The biggest barrier to adoption of EVs is charging infrastructure. At RedHawk Energy we're poised to take our knowledge and experience with Solar (PV), Energy Storage, Fuel Cells and other advanced technologies to offer expanded EV charging power infrastructure options that are clean, **green** and reliable.

How We Can Help?

Technology Education

As a leader in the deployment of advanced energy technologies over the last 40+ years we are here to guide and educate you on the application considerations, advantages and limitations of current technology.

Feasibility Analysis

Over the years we've found that sometimes the option just isn't feasible. We pride ourselves on being honest with our customers. If the solution makes sense we will let you know, if it doesn't we will be honest with you.

Design & Engineering

We have the personnel, tools and experience necessary to design and engineer solutions with multiple components designed to cohesively operate together.

About Us

RedHawk Energy Systems, LLC is an ISO 9001:2015 certified value-added manufacturing subsidiary of the Arthur N. Ulrich Company. Based in Pataskala, OH we help customers tackle their critical prime and back-up power challenges with innovative solutions ranging from a few watts to several kilowatts.

- **Solar (PV) Power Systems**
- **RP Series Retractable Mast**
- **Solid Oxide Fuel Cells**
- **Alkaline Fuel Cells**
- **Stirling Engine Generators**
- **EV Charging Power Solutions**
- **Micro-Wind Turbines**
- **Hybrid Power Systems**
- **Energy Storage (Batteries)**
- **Battery Boxes**
- **Switch Boost™ 120V, 24V & 12V Systems**

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